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Party #7/C

SEQUENCE LISTING

<110> Gotschlich, Emil C.

<120> GLYCOSYLTRANSFERASES FOR BIOSYNTHESIS OF OLIGOSACCHARIDES, AND
GENES ENCODING THEM

<130> 040853-01-5029-02

<140> 10/007,267

<141> 2001-12-03

<150> US 09/333,412

<151> 1999-06-15

<150> US 08/878,360

<151> 1997-06-18

<150> US 08/683,426

<151> 1996-07-18

<150> US 08/312,387

<151> 1994-09-24

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<170> PatentIn version 3.2

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Ile Tyr
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 <211> 279
 <212> PRT
 <213> Neisseria gonorrhoeae

<400> 8

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His	Ile	Ala	Ala	Thr	Phe	Gly	Ser	Arg	Gly	Ile	Pro	Phe	Gln	Phe	Phe
			20					25					30		
Asp	Ala	Leu	Met	Pro	Ser	Glu	Arg	Leu	Glu	Arg	Ala	Met	Ala	Glu	Leu
		35					40					45			
Val	Pro	Gly	Leu	Ser	Ala	His	Pro	Tyr	Leu	Ser	Gly	Val	Glu	Lys	Ala
		50				55					60				
Cys	Phe	Met	Ser	His	Ala	Val	Leu	Trp	Glu	Gln	Ala	Leu	Asp	Glu	Gly
65					70					75				80	
Val	Pro	Tyr	Ile	Ala	Val	Phe	Glu	Asp	Asp	Val	Leu	Leu	Gly	Glu	Gly
				85					90					95	
Ala	Glu	Gln	Phe	Leu	Ala	Glu	Asp	Thr	Trp	Leu	Gln	Glu	Arg	Phe	Asp
			100					105					110		
Pro	Asp	Ser	Ala	Phe	Val	Val	Arg	Leu	Glu	Thr	Met	Phe	Met	His	Val
		115					120					125			

Leu Thr Ser Pro Ser Gly Val Ala Asp Tyr Gly Gly Arg Ala Phe Pro
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 Leu Leu Glu Ser Glu His Cys Gly Thr Ala Gly Tyr Ile Ile Ser Arg
 145 150 155 160
 Lys Ala Met Arg Phe Phe Leu Asp Arg Phe Ala Val Leu Pro Pro Glu
 165 170 175
 Arg Leu His Pro Val Asp Leu Met Met Phe Gly Asn Pro Asp Asp Arg
 180 185 190
 Glu Gly Met Pro Val Cys Gln Leu Asn Pro Ala Leu Cys Ala Gln Glu
 195 200 205
 Leu His Tyr Ala Lys Phe His Asp Gln Asn Ser Ala Leu Gly Ser Leu
 210 215 220
 Ile Glu His Asp Arg Arg Leu Asn Arg Lys Gln Gln Trp Arg Asp Ser
 225 230 235 240
 Pro Ala Asn Thr Phe Lys His Arg Leu Ile Arg Ala Leu Thr Lys Ile
 245 250 255
 Gly Arg Glu Arg Glu Lys Arg Arg Gln Arg Arg Glu Gln Leu Ile Gly
 260 265 270
 Lys Ile Ile Val Pro Phe Gln
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 <213> Artificial Sequence

<220>
 <223> PCR primer

<400> 9
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21

<210> 10
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 <212> DNA
 <213> Artificial Sequence

<220>
 <223> PCR primer

<400> 10
 aaaacatgca ggaattgacg at

22

<210> 11
 <211> 348
 <212> PRT
 <213> non-Neisseria

<400> 11

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Tyr	Phe	Ala	Gln	Ser	Leu	Ala	Ala	Val	Val	Asn	Gln	Thr	Trp	Arg	Asn
			20					25					30		
Leu	Asp	Ile	Leu	Ile	Val	Asp	Asp	Gly	Ser	Thr	Asp	Gly	Thr	Leu	Ala
		35					40					45			
Ile	Ala	Lys	Asp	Phe	Gln	Lys	Arg	Asp	Ser	Arg	Ile	Lys	Ile	Leu	Ala
	50					55					60				
Gln	Ala	Gln	Asn	Ser	Gly	Leu	Ile	Pro	Ser	Leu	Asn	Ile	Gly	Leu	Asp
65					70					75					80
Glu	Leu	Ala	Lys	Ser	Gly	Gly	Gly	Gly	Gly	Glu	Tyr	Ile	Ala	Arg	Thr
				85					90					95	
Asp	Ala	Asp	Asp	Ile	Ala	Ser	Pro	Gly	Trp	Ile	Glu	Lys	Ile	Val	Gly
			100					105					110		
Glu	Met	Glu	Lys	Asp	Arg	Ser	Ile	Ile	Ala	Met	Gly	Ala	Trp	Leu	Glu
		115					120					125			
Val	Leu	Ser	Glu	Glu	Lys	Asp	Gly	Asn	Arg	Leu	Ala	Arg	His	His	Lys
	130					135					140				
His	Gly	Lys	Ile	Trp	Lys	Lys	Pro	Thr	Arg	His	Glu	Asp	Ile	Ala	Ala
145					150					155					160
Phe	Phe	Pro	Phe	Gly	Asn	Pro	Ile	His	Asn	Asn	Thr	Met	Ile	Met	Arg
				165					170					175	
Arg	Ser	Val	Ile	Asp	Gly	Gly	Leu	Arg	Tyr	Asp	Thr	Glu	Arg	Asp	Trp
			180					185					190		
Ala	Glu	Asp	Tyr	Gln	Phe	Trp	Tyr	Asp	Val	Ser	Lys	Leu	Gly	Arg	Leu
		195					200						205		
Ala	Tyr	Tyr	Pro	Glu	Ala	Leu	Val	Lys	Tyr	Arg	Leu	His	Ala	Asn	Gln
	210					215					220				
Val	Ser	Ser	Lys	His	Ser	Val	Arg	Gln	His	Glu	Ile	Ala	Gln	Gly	Ile
225					230					235					240
Gln	Lys	Thr	Ala	Arg	Asn	Asp	Phe	Leu	Gln	Ser	Met	Gly	Phe	Lys	Thr
				245					250					255	
Arg	Phe	Asp	Ser	Leu	Glu	Tyr	Arg	Gln	Thr	Lys	Ala	Ala	Ala	Tyr	Glu
			260					265					270		
Leu	Pro	Glu	Lys	Asp	Leu	Pro	Glu	Glu	Asp	Phe	Glu	Arg	Ala	Arg	Arg
		275					280					285			
Phe	Leu	Tyr	Gln	Cys	Phe	Lys	Arg	Thr	Asp	Thr	Pro	Pro	Ser	Gly	Ala

290	295	300
Trp Leu Asp Phe Ala Ala Asp Gly Arg Met Arg Arg Leu Phe Thr Leu		
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Arg Gln Tyr Phe Gly Ile Leu Tyr Arg Leu Ile Lys Asn Arg Arg Gln		
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Ala Arg Ser Asp Ser Ala Gly Lys Glu Gln Glu Ile		
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Leu Asp Ile Leu Ile Val Asp Asp Gly Ser Thr Asp Gly Thr Pro Ala		
	35	40 45
Ile Ala Arg His Phe Gln Glu Gln Asp Gly Arg Ile Arg Ile Ile Ser		
	50	55 60
Asn Pro Arg Asn Leu Gly Phe Ile Ala Ser Leu Asn Ile Gly Leu Asp		
	65	70 75 80
Glu Leu Ala Lys Ser Gly Gly Gly Glu Tyr Ile Ala Arg Thr Asp Ala		
	85	90 95
Asp Asp Ile Ala Ser Pro Gly Trp Ile Glu Lys Ile Val Gly Glu Met		
	100	105 110
Glu Lys Asp Arg Ser Ile Ile Ala Met Gly Ala Trp Leu Glu Val Leu		
	115	120 125
Ser Glu Glu Asn Asn Lys Ser Val Leu Ala Ala Ile Ala Arg Asn Gly		
	130	135 140
Ala Ile Trp Asp Lys Pro Thr Arg His Glu Asp Ile Val Ala Val Phe		
	145	150 155 160
Pro Phe Gly Asn Pro Ile His Asn Asn Thr Met Ile Met Arg Arg Ser		
	165	170 175
Val Ile Asp Gly Gly Leu Arg Phe Asp Pro Ala Tyr Ile His Ala Glu		
	180	185 190
Asp Tyr Lys Phe Trp Tyr Glu Ala Gly Lys Leu Gly Arg Leu Ala Tyr		
	195	200 205

Tyr Pro Glu Ala Leu Val Lys Tyr Arg Phe His Gln Asp Gln Thr Ser
210 215 220

Ser Lys Tyr Asn Leu Gln Gln Arg Arg Thr Ala Trp Lys Ile Lys Glu
225 230 235 240

Glu Ile Arg Ala Gly Tyr Trp Lys Ala Ala Gly Ile Ala Val Gly Ala
245 250 255

Asp Cys Leu Asn Tyr Gly Leu Leu Lys Ser Thr Ala Tyr Ala Leu Tyr
260 265 270

Glu Lys Ala Leu Ser Gly Gln Asp Ile Gly Cys Leu Arg Leu Phe Leu
275 280 285

Tyr Glu Tyr Phe Leu Ser Leu Glu Lys Tyr Ser Leu Thr Asp Leu Leu
290 295 300

Asp Phe Leu Thr Asp Arg Val Met Arg Lys Leu Phe Ala Ala Pro Gln
305 310 315 320

Tyr Arg Lys Ile Leu Lys Lys Met Leu Arg Pro Trp Lys Tyr Arg Ser
325 330 335

Tyr

<210> 13

<211> 306

<212> PRT

<213> Escherichia coli

<400> 13

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Ile Ser Ile Ala Ser Ile Leu Lys Tyr Asn Glu Gly Ser Arg Leu Cys
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Phe His Ile Phe Thr Asp Tyr Phe Gly Asp Asp Asp Arg Lys Tyr Phe
35 40 45

Asp Ala Leu Ala Leu Gln Tyr Lys Thr Arg Ile Lys Ile Tyr Leu Ile
50 55 60

Asn Gly Asp Arg Leu Arg Ser Leu Pro Ser Thr Lys Asn Trp Thr His
65 70 75 80

Ala Ile Tyr Phe Arg Phe Val Ile Ala Asp Tyr Phe Ile Asn Lys Ala
85 90 95

Pro Lys Val Leu Tyr Leu Asp Ala Asp Ile Ile Cys Gln Gly Thr Ile
100 105 110

Glu Pro Leu Ile Asn Phe Ser Phe Pro Asp Asp Lys Val Ala Met Val
115 120 125

Val	Thr	Glu	Gly	Gln	Ala	Asp	Trp	Trp	Glu	Lys	Arg	Ala	His	Ser	Leu	130	135	140
Gly	Val	Ala	Gly	Ile	Ala	Lys	Gly	Tyr	Phe	Asn	Ser	Gly	Phe	Leu	Leu	145	150	155
Ile	Asn	Thr	Ala	Gln	Trp	Ala	Ala	Gln	Gln	Val	Ser	Ala	Arg	Ala	Ile	165	170	175
Ala	Met	Leu	Asn	Glu	Pro	Glu	Ile	Ile	Lys	Lys	Ile	Thr	His	Pro	Asp	180	185	190
Gln	Asp	Val	Leu	Asn	Met	Leu	Leu	Ala	Asp	Lys	Leu	Ile	Phe	Ala	Asp	195	200	205
Ile	Lys	Tyr	Asn	Thr	Gln	Phe	Ser	Leu	Asn	Tyr	Gln	Leu	Lys	Glu	Ser	210	215	220
Phe	Ile	Asn	Pro	Val	Thr	Asn	Asp	Thr	Ile	Phe	Ile	His	Tyr	Ile	Gly	225	230	235
Pro	Thr	Lys	Pro	Trp	His	Asp	Trp	Ala	Trp	Asp	Tyr	Pro	Val	Ser	Gln	245	250	255
Ala	Phe	Met	Glu	Ala	Lys	Asn	Ala	Ser	Pro	Trp	Lys	Asn	Thr	Ala	Leu	260	265	270
Leu	Lys	Pro	Asn	Asn	Ser	Asn	Gln	Leu	Arg	Tyr	Ser	Ala	Lys	His	Met	275	280	285
Leu	Lys	Lys	His	Arg	Tyr	Leu	Lys	Gly	Phe	Ser	Asn	Tyr	Leu	Phe	Tyr	290	295	300
Phe	Ile															305		